

THAT WHICH IS CLAIMED IS:

1. A formable, bright metallized laminate,
comprising:

a formable clear coat film;

5 a first discontinuous layer of metal islands
deposited on said formable clear coat film; and

a second discontinuous layer of metal islands,
wherein said first discontinuous layer of metal islands
is positioned between said formable clear coat film and
10 said second discontinuous layer of metal islands.

2. A metallized laminate according to Claim 1,
wherein said formable clear coat film has a
microscopically-smooth surface.

15 3. A metallized laminate according to Claim 2,
wherein the microscopically-smooth surface of said
formable clear coat film has a roughness average of less
than about 0.75 micron.

20 4. A metallized laminate according to Claim 1,
wherein said formable clear coat film is a tinted clear
coat film.

25 5. A metallized laminate according to Claim 1,
wherein said formable clear coat film has a design.

6. A metallized laminate according to Claim 1, wherein said formable clear coat film comprises polyvinyl fluoride.

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7. A metallized laminate according to Claim 1, wherein said formable clear coat film comprises polyvinylidene difluoride.

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8. A metallized laminate according to Claim 1, wherein said formable clear coat film is a polymeric composition selected from the group consisting of fluoropolymers, acrylic polymers, polyurethanes, ionomers, polycarbonates, polyolefins, polyethylene glycol-modified polyesters, polyamide polymers, and copolymers, blends, and alloys that include these polymeric compositions.

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9. A metallized laminate according to Claim 1, wherein said formable clear coat film comprises between about 10 and 70 weight percent of an acrylic polymer and between about 30 and 90 weight percent of a fluoropolymer.

10. A metallized laminate according to Claim 9,
wherein said formable clear coat film comprises between
about 30 and 50 weight percent of an acrylic polymer and
between about 50 and 70 weight percent of a fluoropolymer
5 comprising polyvinylidene difluoride.

11. A metallized laminate according to Claim 1,
said first discontinuous metal layer having a first
surface that is contiguous to said formable clear coat
10 film, and a second surface that is contiguous to said
second discontinuous metal layer, wherein said second
surface of said first metal layer includes a microscopic
transitional sub-layer.

12. A metallized laminate according to Claim 11,
wherein said microscopic transitional sub-layer is a
plasma-treated sub-layer.
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13. A metallized laminate according to Claim 11,
wherein said microscopic transitional sub-layer is a
deposited metal oxide sub-layer.
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14. A metallized laminate according to Claim 13,
wherein the composition of said microscopic transitional
25 metal oxide sub-layer is an oxide of the kind of metal
that forms said first discontinuous layer of metal
islands.

15. A metallized laminate according to Claim 13,
wherein the composition of said microscopic transitional
metal oxide sub-layer is an oxide of a metal that is
different from the kind of metal that forms said first
5 discontinuous layer of metal islands.

16. A metallized laminate according to Claim 1,
wherein said first discontinuous metal layer is selected
from the group consisting of indium, tin, and alloys and
10 blends thereof.

17. A metallized laminate according to Claim 1,
wherein said first discontinuous metal layer and said
second discontinuous metal layer are selected from the
group consisting of aluminum, cadmium, cobalt, copper,
15 chromium, gallium, gold, indium, iron, nichrome, nickel,
palladium, platinum, rhodium, stainless steel, tin, zinc,
and alloys and blends containing these metals.

18. A metallized laminate according to Claim 1,
wherein said second discontinuous metal layer has the
same composition as said first discontinuous metal layer.

19. A metallized laminate according to Claim 1,
25 wherein said second discontinuous metal layer has a
different composition from said first discontinuous metal
layer.

20. A metallized laminate according to Claim 1,
wherein said second discontinuous metal layer comprises
metal islands having an average width of less than about
400 nm.

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21. A metallized laminate according to Claim 1,
wherein said second discontinuous metal layer comprises
metal islands having an average width of less than about
200 nm.

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22. A metallized laminate according to Claim 1,
wherein said second discontinuous metal layer comprises
metal islands having an average width of less than about
100 nm.

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23. A metallized laminate according to Claim 1,
further comprising at least one additional discontinuous
layer of metal islands positioned between said first
discontinuous metal layer and said second discontinuous
metal layer.

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24. A metallized laminate according to Claim 23,
wherein:

the discontinuous metal layers are contiguous; and

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said first discontinuous metal layer and each said
additional discontinuous metal layer have a first surface
that is nearer the formable clear coat film and a second
surface that is opposite the formable clear coat film,

wherein each said second surface comprises a microscopic transitional sub-layer.

5 25. A metallized laminate according to Claim 1, further comprising an adhesive layer positioned on said second discontinuous metal layer, opposite said first discontinuous metal layer.

10 26. A metallized laminate according to Claim 25, wherein said adhesive layer comprises a pressure-sensitive adhesive.

15 27. A metallized laminate according to Claim 25, wherein said adhesive layer comprises a heat-reactive adhesive.

20 28. A metallized laminate according to Claim 25, wherein said adhesive layer comprises a crosslinking adhesive system.

 29. A metallized laminate according to Claim 25, wherein said adhesive layer comprises a multicomponent adhesive.

25 30. A metallized laminate according to Claim 25, wherein said adhesive layer comprises polyurethane.

31. A metallized laminate according to Claim 25,
wherein said adhesive layer comprises acrylic.

32. A metallized laminate according to Claim 25,
wherein:

said adhesive layer comprises a polyurethane layer
and an acrylic layer; and

said polyurethane layer of said adhesive layer is
positioned between said second discontinuous metal layer
and said acrylic layer of said adhesive layer.

33. A metallized laminate according to Claim 25,
wherein:

said adhesive layer comprises a polyurethane layer,
an acrylic layer, and a chlorinated polyolefin layer;

said polyurethane layer is positioned between said
second discontinuous metal layer and said acrylic layer;
and

said acrylic layer is positioned between said
polyurethane layer and said chlorinated polyolefin layer.

34. A metallized laminate according to Claim 25,
wherein:

said adhesive layer comprises a layer made of an
acrylic/polyurethane blend, and a chlorinated polyolefin
layer; and

said acrylic/polyurethane layer is positioned between said second discontinuous metal layer and said chlorinated polyolefin layer.

5 35. A metallized laminate according to Claim 25, further comprising a thermoplastic backing layer placed on said adhesive layer.

10 36. A metallized laminate according to Claim 35, wherein said thermoplastic backing layer is selected from the group consisting of polyvinyl chloride, thermoplastic olefins, polycarbonates, acrylonitrile-butadiene-styrene copolymers, polystyrene, polyamide polymers, polyethylene, polypropylene, and copolymers, blends, and alloys including these polymeric compositions.

15 37. A metallized laminate according to Claim 35, wherein the metallized laminate incorporates a component selected from the group consisting of a tinted clear coat film, a tinted adhesive layer, and a tinted thermoplastic backing layer.

20 38. A metallized laminate according to Claim 1, further comprising an adhesive layer contiguously positioned on said second discontinuous metal layer, opposite said first discontinuous metal layer.

39. A metallized laminate according to Claim 38,
further comprising a thermoplastic backing layer
contiguously positioned on said adhesive layer, opposite
said second discontinuous metal layer, wherein said
5 adhesive layer comprises polyurethane and said
thermoplastic backing layer is selected from the group
consisting of polyvinyl chloride and acrylonitrile-
butadiene-styrene copolymers.

10 40. A metallized laminate according to Claim 38,
further comprising a thermoplastic backing layer; and
wherein said adhesive layer comprises a polyurethane
layer and an acrylic layer, said polyurethane layer of
said adhesive layer being contiguously positioned between
15 said second discontinuous metal layer and said acrylic
layer of said adhesive layer; and

wherein said thermoplastic backing layer comprises
an acrylonitrile-butadiene-styrene copolymer layer
contiguously positioned on said acrylic layer of said
20 adhesive layer.

41. A metallized laminate according to Claim 38,
further comprising a thermoplastic backing layer; and

25 wherein said adhesive layer comprises a polyurethane
layer, an acrylic layer, and a chlorinated polyolefin
layer, said polyurethane layer being contiguously
positioned between said second discontinuous metal layer
and said acrylic layer, and said acrylic layer being

contiguously positioned between said polyurethane layer and said chlorinated polyolefin layer; and

wherein said thermoplastic backing layer comprises a thermoplastic olefin layer contiguously positioned on
5 said chlorinated polyolefin layer of said adhesive layer.

42. A metallized laminate according to Claim 38, further comprising a thermoplastic backing layer;

wherein said adhesive layer comprises an
10 acrylic/polyurethane layer and a chlorinated polyolefin layer, said acrylic/polyurethane layer being contiguously positioned between said second discontinuous metal layer and said chlorinated polyolefin layer; and

wherein said thermoplastic backing layer comprises a
15 thermoplastic olefin layer contiguously positioned on said chlorinated polyolefin layer of said adhesive layer.

43. A metallized laminate according to Claim 1,
20 further comprising at least one additional formable clear coat film positioned on said formable clear coat film, opposite said first discontinuous metal layer.

44. A metallized laminate according to Claim 1,
25 further comprising an extensible mask layer on the surface of said formable clear coat film opposite said first discontinuous metal layer.

45. A metallized laminate according to Claim 1, further comprising a thermoplastic leveling layer that is positioned between said formable clear coat film and said first discontinuous metal layer.

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46. A metallized laminate according to Claim 45, wherein said thermoplastic leveling layer comprises polyvinyl fluoride and said formable clear coat film comprises polyvinylidene difluoride.

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47. A metallized laminate according to Claim 45, further comprising a thermoplastic primer layer positioned between said formable clear coat film and said leveling layer.

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48. A part formed from the formable metallized laminate of Claim 1.

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49. A part according to Claim 48 that has been formed using a technique selected from the group consisting of injection molding, blow molding, compression molding, thermoforming, vacuum forming, in-mold forming, and extrusion lamination.

50. A formable, bright metallized laminate,
comprising:

a formable polymeric clear coat film;

a first discontinuous layer of metal islands
5 deposited on said clear coat film; and

a second discontinuous layer of metal islands,
wherein said first discontinuous layer of metal islands
is positioned between said clear coat film and said
second discontinuous layer of metal islands;

10 wherein said first discontinuous metal layer has a
first surface that is contiguous to said formable clear
coat film, and a second surface that is contiguous to
said second discontinuous metal layer, wherein said
15 second surface of said first metal layer includes a
microscopic transitional sub-layer.

51. A metallized laminate according to Claim 50,
wherein said microscopic transitional sub-layer is a
plasma-treated sub-layer.

20 52. A metallized laminate according to Claim 50,
wherein said microscopic transitional sub-layer is a
deposited metal oxide sub-layer.

25 53. A metallized laminate according to Claim 50,
wherein said second discontinuous metal layer comprises
metal islands having an average width of less than about
200 nm.

54. A metallized laminate according to Claim 50,
wherein said second discontinuous metal layer comprises
metal islands having an average width of less than about
100 nm.

55. A metallized laminate according to Claim 50,
wherein said formable clear coat film is a polymeric
composition selected from the group consisting of
fluoropolymers, acrylic polymers, polyurethanes,
ionomers, polycarbonates, polyolefins, PEG-modified
polyesters, polyamide polymers, and copolymers, blends,
and alloys that include these polymeric compositions.

56. A metallized laminate according to Claim 50,
wherein said first discontinuous metal layer and said
second discontinuous metal layer are selected from the
group consisting of aluminum, cadmium, cobalt, copper,
chromium, gallium, gold, indium, iron, nichrome, nickel,
palladium, platinum, rhodium, stainless steel, tin, zinc,
and alloys and blends containing these metals.

57. A metallized laminate according to Claim 50,
further comprising an additional formable clear coat film
positioned on said formable clear coat film, opposite
said first discontinuous metal layer.

58. A metallized laminate according to Claim 50, further comprising an adhesive layer placed on said second discontinuous metal layer, opposite said first discontinuous metal layer.

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59. A metallized laminate according to Claim 58, further comprising a thermoplastic backing layer placed on said adhesive layer.

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60. A part formed from the metallized laminate of Claim 50.

61. A formable, bright metallized laminate, comprising:

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a formable clear coat film; and

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a plurality of discontinuous metal island layers deposited on said clear coat film, said plurality of discontinuous metal island layers comprising a first outer discontinuous layer of metal islands that is deposited on said clear coat film, a second outer discontinuous layer of metal islands, and at least one inner discontinuous layer of metal islands positioned between said first and second outer discontinuous metal layers.

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62. A metallized laminate according to Claim 61, wherein said formable clear coat film comprises polyvinyl fluoride.

63. A metallized laminate according to Claim 61,
wherein said formable clear coat film comprises
polyvinylidene difluoride.

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64. A metallized laminate according to Claim 61,
wherein said formable clear coat film is a polymeric
composition selected from the group consisting of
fluoropolymers, acrylic polymers, polyurethanes,
10 ionomers, polycarbonates, polyolefins, PEG-modified
polyesters, polyamide polymers, and copolymers, blends,
and alloys including these polymeric compositions.

65. A metallized laminate according to Claim 61,
15 wherein said formable clear coat film comprises between
about 10 and 70 weight percent of an acrylic polymer and
between about 30 and 90 weight percent of fluoropolymer.

66. A metallized laminate according to Claim 61,
20 wherein at least one said discontinuous metal layer is
selected from the group consisting of aluminum, cadmium,
cobalt, copper, chromium, gallium, gold, indium, iron,
nichrome, nickel, palladium, platinum, rhodium, stainless
steel, tin, zinc, and alloys and blends containing these
25 metals.

67. A metallized laminate according to Claim 61,
further comprising a thermoplastic leveling layer that is
positioned between said formable clear coat film and said
first outer discontinuous layer, wherein said
5 thermoplastic leveling layer comprises polyvinyl fluoride
and said formable clear coat film comprises
polyvinylidene difluoride.

68. A metallized laminate according to Claim 61,
10 wherein said plurality of discontinuous metal island
layers is contiguous.

69. A metallized laminate according to Claim 68,
wherein:

15 said first outer discontinuous metal layer and each
said inner discontinuous metal layer have a first surface
that is nearer the formable clear coat film and a second
surface that is opposite the formable clear coat film;
and

20 each said second surface comprises a microscopic
transitional sub-layer.

70. A metallized laminate according to Claim 69,
wherein each said microscopic transitional sub-layer is
25 selected from the group consisting of a plasma-treated
sub-layer and a deposited metal oxide sub-layer.

71. A metallized laminate according to Claim 61, wherein said second outer discontinuous metal layer comprises metal islands having an average width of less than about 400 nm.

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72. A metallized laminate according to Claim 61, wherein said second outer discontinuous metal layer comprises metal islands having an average width of less than about 200 nm.

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73. A metallized laminate according to Claim 61, wherein said second outer discontinuous metal layer comprises metal islands having an average width of less than about 100 nm.

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74. A metallized laminate according to Claim 61, further comprising an adhesive layer positioned on said second outer discontinuous metal layer, opposite said formable clear coat film.

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75. A metallized laminate according to Claim 74, wherein said adhesive layer is selected from the group consisting of pressure-sensitive adhesives, heat-reactive adhesives, crosslinking adhesives, and multicomponent adhesives.

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76. A metallized laminate according to Claim 74, wherein said adhesive layer comprises polyurethane.

77. A metallized laminate according to Claim 74,
wherein said adhesive layer comprises acrylic.

5 78. A metallized laminate according to Claim 74,
further comprising a thermoplastic backing layer placed
on said adhesive layer, wherein said backing layer is
selected from the group consisting of polyvinyl chloride,
thermoplastic olefins, polycarbonates, acrylonitrile-
10 butadiene-styrene copolymers, polystyrene, polyamide
polymers, polyethylene, polypropylene, and copolymers,
blends, and alloys including these polymeric
compositions.

15 79. A metallized laminate according to Claim 78,
wherein the metallized laminate incorporates a component
selected from the group consisting of a tinted clear coat
film, a tinted adhesive layer, and a tinted thermoplastic
backing layer.

20 80. A metallized laminate according to Claim 61,
further comprising at least one additional formable clear
coat film positioned on said formable clear coat film,
opposite said first outer discontinuous metal layer.

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81. A metallized laminate according to Claim 61, further comprising an extensible mask layer on the surface of said formable clear coat film, opposite said first outer discontinuous metal layer.

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82. A part formed from the formable metallized laminate of Claim 61.

83. A method for making a formable, bright
10 metallized laminate, comprising:

depositing a first discontinuous layer of metal islands upon a formable clear coat film; and

depositing a second discontinuous layer of metal islands onto the first discontinuous layer of metal islands.
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84. A method according to Claim 83, wherein the step of depositing a first discontinuous metal layer upon the formable clear coat film further comprises bonding
20 the first discontinuous metal layer to the formable clear coat film at an adhesion strength of at least about two pounds per inch.

85. A method according to Claim 83, wherein the
25 step of depositing a first discontinuous metal layer upon the formable clear coat film further comprises plasma treating the first discontinuous metal layer to form a microscopic transitional sub-layer.

86. A method according to Claim 83, further comprising depositing a microscopic metal oxide transitional sub-layer after the step of depositing a first discontinuous layer of metal islands and before the step of depositing a second discontinuous layer of metal islands.

87. A method according to Claim 83, further comprising press polishing the formable clear coat film.

88. A method according to Claim 83, wherein the step of depositing a first discontinuous layer of metal islands upon a formable clear coat film comprises depositing a first discontinuous layer of metal islands upon a microscopically-smooth surface of a formable clear coat film.

89. A method according to Claim 83, wherein the step of depositing a first discontinuous metal layer upon the formable clear coat film and the step of depositing a second discontinuous metal layer upon the first discontinuous metal comprise depositing a discontinuous layer of metal islands selected from the group consisting of aluminum, cadmium, cobalt, copper, chromium, gallium, gold, indium, iron, nichrome, nickel, palladium, platinum, rhodium, stainless steel, tin, zinc, and alloys and blends containing these metals.

90. A method according to Claim 83, wherein the step of depositing a first discontinuous layer of metal islands upon a formable clear coat film comprises depositing a first discontinuous layer of metal islands upon a formable clear coat film selected from the group consisting of fluoropolymers, acrylic polymers, polyurethanes, ionomers, polycarbonates, polyolefins, PEG-modified polyesters, polyamide polymers, and copolymers, blends, and alloys including these polymeric compositions.

91. A method according to Claim 83, wherein the step of depositing a first discontinuous layer of metal islands upon a formable clear coat film comprises depositing a first discontinuous layer of metal islands upon a formable film comprising polyvinyl fluoride.

92. A method according to Claim 83, wherein the step of depositing a first discontinuous layer of metal islands upon a formable clear coat film comprises depositing a first discontinuous layer of metal islands upon a formable film comprising polyvinylidene difluoride.

93. A method according to Claim 92, further comprising press polishing the formable polyvinylidene difluoride film.

94. A method according to Claim 83, further comprising placing an adhesive layer on the second discontinuous metal layer, opposite the clear coat film.

5 95. A method according to Claim 94, wherein the step placing an adhesive layer on the second discontinuous metal layer comprises coating the surface of the second discontinuous metal layer with an adhesive selected from the group consisting of pressure-sensitive
10 adhesives, heat-reactive adhesives, crosslinking adhesives, and multicomponent adhesives.

15 96. A method according to Claim 94, wherein the step of placing an adhesive layer on the second discontinuous metal layer comprises coating onto the surface of the second discontinuous metal layer an adhesive selected from the group consisting of polyurethane adhesives and acrylic adhesives.

20 97. A method according to Claim 94, further comprising bonding a thermoplastic backing layer to the adhesive layer.

25 98. A method according to Claim 97, wherein the step of bonding a thermoplastic backing layer to the adhesive layer comprises bonding a thermoplastic backing layer selected from the group consisting of polyvinyl chloride, thermoplastic olefins, acrylonitrile-butadiene-styrene copolymers, polycarbonates, polystyrene,

polyamide polymers, polyethylene, polypropylene, and copolymers, blends, and alloys including these polymeric compositions.

5 99. A method according to Claim 83, further comprising placing an extensible mask layer onto the formable clear coat film, opposite the first discontinuous metal layer.

10 100. A method according to Claim 83, further comprising depositing at least one additional discontinuous layer of metal islands between the first discontinuous metal layer and the second discontinuous metal layer.

15 101. A method according to Claim 83, further comprising depositing an additional clear coat on the formable clear coat film.

102. A method for making a formable, bright metallized laminate, comprising:

depositing a plurality of contiguous, discontinuous layers of metal islands upon a clear coat film; and

5 surface treating each discontinuous layer of metal islands to form a microscopic transitional sub-layer before depositing an additional contiguous, discontinuous layer of metal islands.

10 103. A method according to Claim 102, wherein the step of surface treating each discontinuous layer of metal islands comprises plasma treating each discontinuous layer of metal islands.

15 104. A method according to Claim 102, wherein the step of surface treating each discontinuous layer of metal islands comprises depositing a microscopic metal oxide transitional sub-layer onto each discontinuous layer of metal islands.

20 105. A method according to Claim 102, wherein the step of depositing a plurality of contiguous, discontinuous layers of metal islands upon a clear coat film comprises depositing a plurality of discontinuous
25 layers of metal islands selected from the group consisting of aluminum, cadmium, cobalt, copper, chromium, gallium, gold, indium, iron, nichrome, nickel, palladium, platinum, rhodium, stainless steel, tin, zinc, and alloys and blends containing these metals.

106. A method according to Claim 102, wherein the
step of depositing a plurality of contiguous,
discontinuous layers of metal islands upon a clear coat
5 film comprises depositing a first discontinuous layer of
metal islands upon a microscopically-smooth surface of a
formable, clear coat film

107. A method according to Claim 102, wherein the
10 step of depositing a plurality of contiguous,
discontinuous layers of metal islands upon a clear coat
film comprises depositing a first discontinuous layer of
metal islands upon a formable film comprising polyvinyl
fluoride.

108. A method according to Claim 102, wherein the
step of depositing a plurality of contiguous,
discontinuous layers of metal islands upon a clear coat
15 film comprises depositing a first discontinuous layer of
metal islands upon a formable film comprising
20 polyvinylidene difluoride.